DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name:	**Giant Resource Recovery, Incorporated (Former Solite Corporation Virginia Solite Division Facility) – Cascade, VA – EPA ID No. VAD046970521 (Also incorporates former GRR, Inc. Facility, EPA I.D. No. VAD077942266)**
Facility Address:	**Cascade, VA**
Facility EPA ID #:	**VAD046970521**

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   __X__ If yes – check here and continue with #2 below.

   _____ If no – re-evaluate existing data, or

   _____ If data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)
Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI
A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies
While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations
EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be "**contaminated**" [1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

__X__ If yes – continue after identifying key contaminants, citing appropriate "levels", and referencing supporting documentation.

_____ If no – skip to #8 and enter "YE" status code, after citing appropriate "levels", and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown – skip to #8 and enter "IN" status code.

RATIONALE:

Solite Corporation, VA Solite Division – Cascade Plant (Solite) formerly produced lightweight aggregate used in manufacture of lightweight masonry units, pre-cast elements, structural concrete and other building materials from 1957 to 2004. Initial operations utilized coal as a primary fuel source for the kilns. The processing facilities are located in Town of Cascade, Pittsylvania County, Virginia. Raw materials were primarily obtained from the on-site slate quarry (lake), located in Rockingham County, North Carolina. In the 1970s, Solite began to use alternative liquid (hazardous waste derived) fuels to provide the energy. The liquids included solvents and other hydrocarbons. The liquid was ignitable (D001) and contained numerous listed hazardous wastes and was subject to the requirement of Solite Hazardous Waste Management Permit under EPA ID number VAD046970521 which became effective January 19, 2004.

Giant Resource Recovery, Inc. (GRR) (formerly Oldover Corporation) owns and formerly operated its hazardous waste storage and blending facility (SWMUs Group T) on the site. The GRR Hazardous Waste Management Permit (EPA ID No. VAD077942266) became effective January 20, 1996 and expired on January 29, 2006.

Both Solite and GRR initiated RCRA Closure in accordance with the requirements of the GRR Permit. Final Closure Reports for the Solite and GRR closure activities were submitted on October 21, 2005 and November 23, 2005, respectively. In July 2006, Solite Corporation received the DEQ's approval of the "clean closure" certifications from both facilities.

Effective January 10, 2006, the Giant Resource Recovery, Inc. (GRR), Cascade, Virginia, facility Permit, under EPA ID No. VAD077942266, was modified to reflect a change in operator and owner of the facility and Permit responsibility from Giant Resource Recovery – Arvonia, Inc. to the Solite Corporation – Virginia Solite Division, Cascade facility and Permit, under EPA ID No. VAD046970521 (new operator), which is owned by the Solite Corporation (new owner).

Concurrent with the above permit modification, effective January 10, 2006, the Solite Corporation – Virginia Solite Division, Cascade facility and Permit, under EPA ID No. VAD046970521, was modified to incorporate the land, the facilities, and the closure and corrective action responsibilities, as applicable, of the GRR, Cascade facility and Permit under EPA ID No. VAD077942266.

The above GRR Cascade facility and the Solite Corporation - Virginia Solite Division, Cascade facility are contiguous RCRA permitted facilities under common ownership and control under Solite Holding, Inc. The GRR Cascade facility Hazardous Waste Management Permit expired on January 29, 2006. Therefore, this above transfer of ownership and control of the GRR facility will enable the CA for the above two contiguous Solite Holding, Inc. Cascade facilities to take place under the Solite Corporation - Virginia Solite Division, Cascade facility Permit under EPA ID No. VAD046970521.

Effective March 15, 2007, the name Solite Corporation – Virginia Solite Division was changed to Giant Resource Recovery, Inc. The owner and operator of the Solite Corporation – Virginia Solite Division, Cascade facility was unchanged by this action.

A total of 26 SWMUs and 6 AOCs have been identified. The Phase I RCRA Facility Investigation (RFI) work was performed in October-November 2005, and December, 2005.

There are currently six (6) monitoring wells and a water supply well on the property containing Solite Cascade. Most GW monitoring wells utilized for the RFI workplan/report (MW-1 to MW-6, and one water supply well) are located around the Quarry Lake. At the east, west and north sides of the Group T Area (hazardous waste storage and fuel blending area) and the Group K Area (within which Baghouse is located), no wells were installed. The above groundwater monitoring wells were installed as part of due diligence activities associated with a potential property acquisition. Groundwater samples were collected from the six monitoring wells and the water supply well and were analyzed for VOCs, PAHs, TPH-DRO and RCRA metals. Additionally, one groundwater sample was collected by the Department of Environmental Quality in the tank farm area from a subsoil boring investigation. Analytical results indicate that the concentrations of the aforementioned constituents in groundwater are below the EPA Region III risk based criteria for tap water and EPA maximum concentration levels. However, because the top of casing elevations have not been surveyed, the groundwater flow direction cannot be confirmed and the position of the monitoring wells as downgradient of facility SWMUs and AOCs cannot be confirmed.

Because existing groundwater data is not sufficient to fully determine groundwater conditions at the facility, soil analytical results were utilized to assess groundwater quality through comparison of soils analytical results to EPA Region III Transfer to Groundwater – Soil Screening Levels (SSLs) with a Dilution Attenuation Factor (DAF) equal to 20. Based on the soil screening, groundwater near the baghouse area and the fuel oil storage area has the potential for contamination (soil analytical results are greater than SSLs). The exceedances are outlined below:

Baghouse area (SWMUs S6a, S6b, S6c):

Constituents for which exceedances of EPA Region III SSLs (DAF=20) were observed in the baghouse area include arsenic, diofuran 2,3,4,7,8-PeCDF, and diofuran 2,3,7,8-TCDD. Arsenic concentrations also exceed the background concentration. Background concentrations for diofurans are unknown. Facility submissions suggest that because arsenic concentrations in groundwater monitoring wells located downgradient of the baghouse area are below the detection limit, that arsenic does not pose a threat to groundwater. Given that groundwater flow direction is not confirmed, the position of the referenced wells as downgradient is not confirmed and migration of arsenic from soil to groundwater cannot be disqualified.

Fuel Storage Area (AOC A4):

Analytical data indicates that the concentration of arsenic at one soil sample location is above the EPA Region III SSL (DAF=20) in the fuel storage area. Facility submissions suggest that because the arsenic concentration in the groundwater monitoring well located downgradient of AOC A4 is below the detection limit, that arsenic does not pose a threat to groundwater. Given that groundwater flow direction is not confirmed, the position of the referenced wells as downgradient from AOC A4 is not confirmed and migration of arsenic from soil to groundwater cannot be disqualified.

The DEQ concludes that it is reasonable to suspect that groundwater is potentially contaminated in these areas based on the soil screening and SSLs – GW Transfer DAF 20 results. Further evaluation of groundwater near the baghouse area and the fuel oil storage area, as well as possibly the tank farm area, will be needed in the Phase II RFI work Plan.

The DEQ's June 18, 2008, letter to the facility states that due to the absence of soils data, additional soil samples must be taken from the Tank Farm Area from the vicinity of the former tanks and unloading line

(SWMUs S13, S14, S15, S16, S17, S18, S19, S20, S21) (See Table 8 in the GES document dated March 9, 2007), analyzed and compared to EPA Region III, risk–based screening criteria or soil screening levels (SSLs) (DAF=20). These soil sampling results could have implications for the groundwater associated with the tank farm. If COC concentrations in soils in the tank farm area are above SSLs DAF20, additional groundwater sample locations in the tank farm area may be necessary to complete the groundwater evaluation and groundwater EI determination.

REFERENCES:

- Phase I RCRA Facility Investigation Workplan (revised March 2007)
- EPA Region III Risk Based Screening Levels

Footnotes:

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

____ If yes – continue after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) – skip to #8 and enter "NO" status code, after providing an explanation.

__X__ If unknown – skip to #8 and enter "IN" status code.

RATIONALE:

There are not enough GW monitoring wells to assess site-wide GW quality. Additionally, top of casing elevations have not been surveyed on existing groundwater monitoring wells, therefore, the groundwater flow direction cannot be confirmed and the position of the monitoring wells as downgradient of facility SWMUs and AOCs cannot be confirmed. The plume(s), if any, therefore, cannot be delineated. (see discussion under Item No.2)

REFERENCES:

Phase I RCRA Facility Investigation Workplan (revised March 2007)

Footnotes:

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_____ If yes – continue after identifying potentially affected surface water bodies

_____ If no – skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies

_____If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

____ If yes – skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no – (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Footnotes:

[3]- As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes – continue after either:

(1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR

(2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination..

_____ If no – (the discharge of "contaminated" groundwater into surface water is potentially significant) continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Footnotes:

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

___ If yes – continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no – enter "NO" status code in #8. skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies

_____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_____YE – Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the GRR facility, EPA ID No. VAD046970521 (Also incorporates former GRR, Inc. Facility, EPA I.D. No. VAD077942266), located in Cascade, Virginia. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

_____ NO – Unacceptable migration of contaminated groundwater is observed or expected.

__X__ IN – More information is needed to make a determination.

Completed by		Fuxing Zhou	Date	9/8/08
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